ERSITY OF ILLINOIS · COLLEGE OF AGRICULTURE · COOPERATIVE EXTENSION SERVICE CIRCULAR 966

# aking Profitable Farm Business Changes Through Education

## Report on the Illinois Test-Demonstration Farm Program

## *Contents*



This circular was prepared by D. E. Erickson, Assistant Professor of Farm Management Extension, and F. P. Graham, Assistant State Leader of Farm Advisers. The authors acknowledge the assistance of the many individuals who made the study possible, including farm advisers in the counties where test-demonstration activities were carried out; A. C. Davis of the Tennessee Valley Authority; and F. M. Sims, J. E. Wills, A. G. Mueller, C. L. Folse, and J. B. Cunningham, all of the Department of Agricultural Economics, University of Illinois. In addition, the Tennessee Valley Authority is recognized for providing support and encouragement in this cooperative effort.

Urbana, Illinois April, 1967

Cooperative Extension Work, University of Illinois, College of Agriculture, and the U.S. Department of Agriculture cooperating. JOHN B. CLAAR, *Director.*
Acts approved by Congress May 8 and June 30, 1914.

## *Highlights*

An evaluation of the Illinois test-demonstration farm program from 1953 to 1965 measured the following accomplishments on 63 farms. Test demonstrators are:

- Using more balanced fertility programs than their neighbors.
- Influencing nearly one-half of their neighbors to improve fertility programs.
- Using more recommended crop and livestock practices than neighbors.
- Increasing average net worth per farm. Average net worth increased from $26,653 to $42,005 on 42 farms where the measure was calculated.
- Increasing ability to manage and repay borrowed funds.
- Using more sources of information than neighbors.
- Providing information through tours. Nearly 3,000 farmers, urbanites, and foreign visitors attended organized tours and meetings on test-demonstration farms studied.
- Providing farm data used in 200 articles in local papers and national farm magazines concerning test-demonstration activities.
- Participating in activities of schools, churches, farm organizations, and other institutions in the community.
- Improving family living. Thirteen families built new homes, thirteen families remodeled their homes, ten families added running water and bathrooms, and seven families added rooms to present homes.
- Making good financial growth, raising above-average crops, and assuming leadership in their communities. These characteristics have been recognized by community leaders.

The group of 43 test demonstrators in the program evaluated for the most recent five years has increased:

- Average earnings from $5,650 to $8,236 per farm.
- Livestock returns over feed cost by 20 percent.
- Corn yields from 53 to 71 bushels per acre.
- Wheat yields from 29 to 36 bushels per acre.
- Total farm production by $6,000 over the five-year period.

With the help of University of Illinois agricultural engineering extension specialists in farmstead planning and farm building arrangement and with the help of the farm adviser the farmstead in the top picture was transformed into the attractive farm complex shown in the bottom photograph. As the whole farm business of this test demonstrator was developed and improved, increased farm earnings supported the costs of improving the farmstead.


A test-demonstration family confers with an assistant farm adviser and test-demonstration representatives about construction of a new farmhouse.

## *The Illinois Program*

The Illinois test-demonstration farm program is a cooperative effort between the University of Illinois College of Agriculture Cooperative Extension Service and the Division of Agricultural Development, Tennessee Valley Authority. Test-demonstration activities in Illinois began in 1937 and involved primarily the testing and demonstrating of phosphate use on grasslands. In 1953, a whole-farm approach was introduced in the Illinois test-demonstration farm program. The whole-farm approach has included not only balanced fertilization, but also the selection of crops, drainage, livestock, buildings, utilization of labor and machinery, financing, and farm family living.

All counties included in the Illinois program except Livingston County are located in the claypan area of southern Illinois. Major soil types are Cisne, Bluford, Ava, Hoyleton, and associated soils. These soils have silt content at the surface, but are underlaid at 12 to 20 inches with a high clay content subsoil. Drainage is a problem. Soils are wet in the spring and drouthy in the summer. These soils are low in available potassium and nitrogen and medium to low in phos-

phorus. Definite soil fertility and whole-farm business management problems are associated with them.

The major objectives of the test-demonstration farm program have been to:

- Introduce TVA experimental fertilizers and demonstrate them in educational programs that promote more efficient fertilizer use.
- Develop complete, well-balanced, efficient, and profitable farm business organization on each farm.
- Encourage cooperators to manage farms to serve as demonstrations to other farmers with similar resources by providing evidence of the results of improved practices, efficient enterprises, and profitable farm businesses.


**Test-demonstration farmers increased crop yields by using TVA experimental fertilizers.**

- Use whole-farm demonstrations as educational tools aiding the development of the agriculture in the community and in the county.
- Apply research findings of the College of Agriculture in a complete, over-all farm program demonstration.

## How the Program Works

An essential part of the Illinois test-demonstration program is the advisory committee. This committee was appointed by the dean of the College of Agriculture and consists of three agronomists, three agricultural economists, two agricultural engineers, one dairy specialist, one animal science specialist, one forestry specialist, one horticulture specialist, and two assistant state leaders of farm advisers.

Farmers participating in the program are selected for a five-year period to demonstrate the use of fertilizer and other farm resource-use combinations that will contribute to increased income. Five or more farms are involved in each county and are typical as to size, type of farming, and tenure. Selections are made by the state advisory committee from nominations made by county farm advisers with assistance from county and local leaders.

Cooperators collect soil samples for their entire farms on both owned and rented land. The soil test is the basis for extension recommenda-

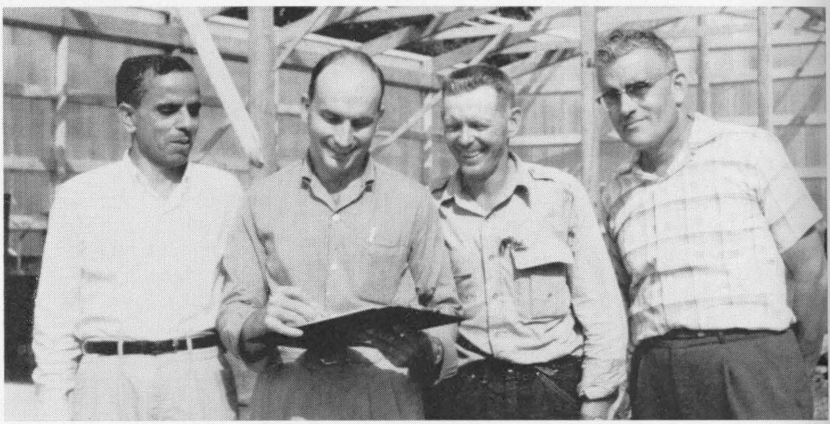
Cooperators in the program took soil samples on their farms. Using such samples, University of Illinois farm advisers can recommend the most profitable soil fertility program for a given farm.

tions on fertility programs. Cooperators provide information on the crop history for each field on the farm, the livestock program, and the financial status of the farm. They are enrolled in a record-keeping service that provides information on making sound management decisions.

Many educational activities are carried out by farm advisers, state extension specialists, and others. Individual consultation with the farmers is the primary teaching method. Countywide tours are also used. Farmers from the area, businessmen, and visitors from the Tennessee Valley Authority attend these tours to see results of the whole-farm educational approach. Newsletters provide information on results of practices, crop yields, and general information to farmers in the project. Also, annual farm records are summarized and reported to the group.

## *About the Study*

How much economic progress have test demonstrators made? How much impact have they had on area farmers? This study was made to answer such questions. The study is based largely on two groups. One group consisted of 20 cooperators who began in 1953, 1954, and 1955 with continuous records extending for ten years. The second group was composed of 43 cooperators who enrolled in 1958, 1959, and 1960. This group had five years of continuous farm business records. The following pages summarize evaluation results.



**Assistance in planning new farm buildings such as this barn under construction can be obtained from University of Illinois specialists. Foreign students also have an opportunity to visit these projects.**

Tours of test-demonstration farms enabled nearby farmers as well as visitors from other counties and from several foreign countries to see results of the whole-farm educational program.

## Ten-Year Group Earnings

One measure of farm income is farm and family earnings. Farm and family earnings are the value of farm production less cash operating expenses and depreciation. Average farm and family earnings over the ten-year period were $7,886 compared to $6,419 in the first three years and $9,615 in the eighth, ninth, and tenth years.

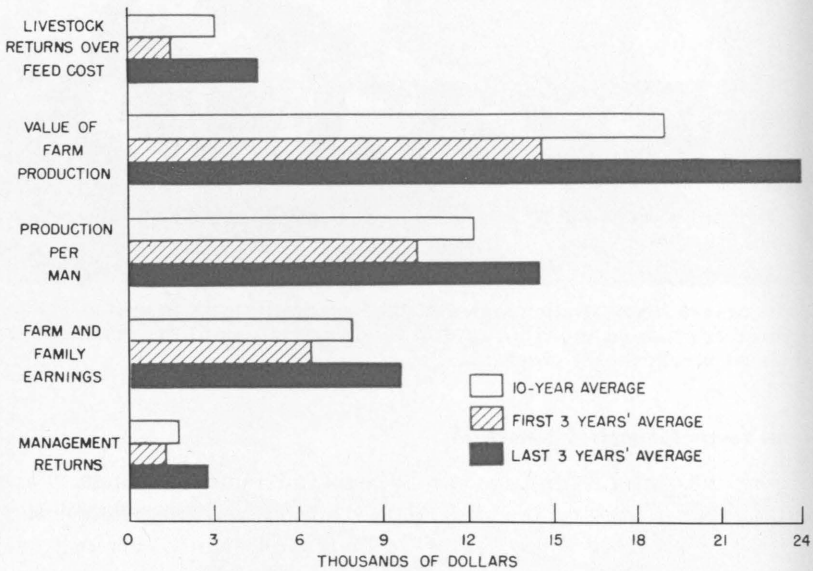
Management returns are the remaining earnings after a charge for unpaid labor and the interest charge on capital are deducted from farm and family earnings. Average returns to management were $1,247 in the first three years to $2,708 in the eighth, ninth, and tenth years. Figure 1 shows measures of returns for the ten-year group.

## Five-Year Group Earnings

The 43 farms in the five-year group increased farm and family earnings from $5,650 in the first and second years to $8,236 in the fourth and fifth years. Average management returns increased from $96 in the first two years to $2,207 in the fourth and fifth years.

## Changes in Net Worth

Net worth statements were obtained from 42 of the 63 farmers in the study. The average net worth of the 42 farmers increased from $26,653 to $42,005. A considerable range was noted in the change in the average net worth. The greatest increase was from $45,000 in 1955 to $200,000 in 1965. The smallest increase in net worth was from $30,000 to $45,000 over the ten-year period.




Returns on 20 test-demonstration farms beginning in 1953, 1954, and 1955. (Fig. 1)

## Livestock Returns

Higher livestock returns contributed to increased earnings. Average livestock returns over feed cost for the ten-year group were $3,139 compared to $1,525 for the first three years and $4,502 in the eighth, ninth, and tenth years.

Similar trends were noted in the five-year group. Five-year average returns over feed cost from livestock were $3,250 compared to $2,808 for the first two years and $3,353 in the fourth and fifth years.

## Feed and Grain Returns

Another returns measure is the feed and grain returns shown in Table 1. This is the sum of grain and feed sales, value of all feeds fed (except milk), and change in value of feed and grain inventories less the value of feed purchased.

Both the ten-year group and the five-year group increased feed and grain returns per tillable acre. The increase in feed and grain returns of $14.67 per tillable acre for the five-year group was more rapid than the $12.77 increase for the ten-year group. In the two groups, increased earnings resulted from improved efficiency in livestock and crop production.

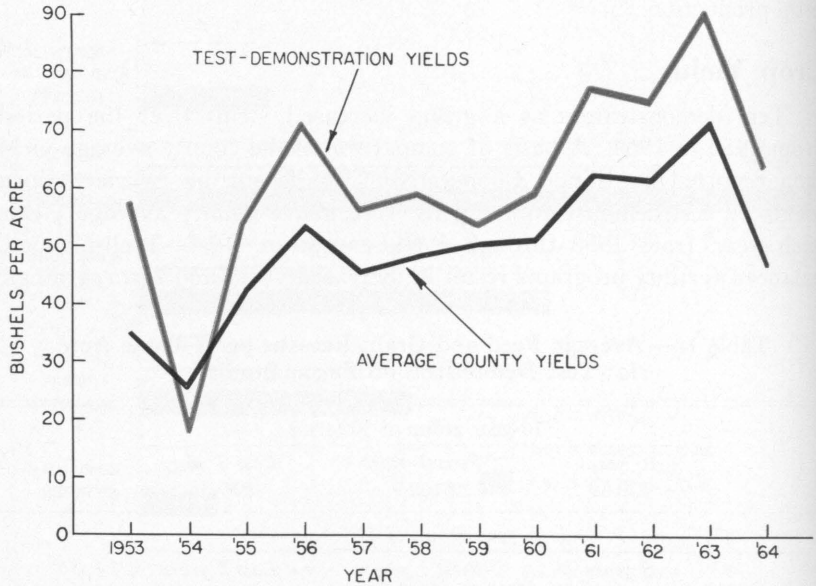
## Crop Yields

Test demonstrators as a group increased yields over the period from 1953 to 1964. A basis of comparison is the county average-yield data reported by Illinois Cooperative Crop Reporting Service. Corn yields on test-demonstration farms were above county average yields each year from 1953 through 1964, except in 1954. Well-planned, balanced fertility programs result in increased yields and farm earnings.

Table 1. — Average Feed and Grain Returns per Tillable Acre for Test-Demonstration Farms Studied

| 10-year group of 20 farms | | |
|---|---|---|
| *10 years* | *First 3 years* | *Last 3 years* |
| $50.39 | $46.59 | $59.36 |
| **5-year group of 43 farms** | | |
| *5 years* | *First 2 years* | *Last 2 years* |
| $49.99 | $42.41 | $57.08 |

The end result of good planning and use of research results from the University of Illinois is a high crop yield.




Comparison of corn yields on test-demonstration farms with average county yields, 1953-1964. (Fig. 2)

## Soybean Yields

Soybean yields have historically been low in the claypan area of Illinois in comparison with other parts of the state. Test demonstrators in the ten-year group increased yields from the 20-bushel level for the first three years to 27 bushels in the final three years. Thirty-seven farms in the five-year group increased soybean yields by 3 bushels per acre between the first and second years and the fourth and fifth years.

## Wheat Yields

Wheat yields averaged 34 bushels per acre over the ten-year period. Thirty-eight-bushel wheat yields per acre were reached in the first and last three-year periods. In the five-year group, wheat yields increased from 29 bushels per acre in the first two years to 36 bushels per acre in the fourth and fifth years. Changes in corn, wheat, and soybean yields for both groups are shown in Table 2.

Table 2. — Average Corn, Wheat, and Soybean Yields for Test-Demonstration Farms Studied

| Crop | 10-year group of 20 farms | | |
|---|---|---|---|
| | 10 years | First 3 years | Last 3 years |
| | *bushels per acre* | | |
| Corn | 63 | 51 | 75 |
| Soybeans | 23 | 20 | 27 |
| Wheat | 34 | 38 | 38 |
| | 5-year group of 43 farms | | |
| | 5 years | First 2 years | Last 2 years |
| | *bushels per acre* | | |
| Corn | 64 | 53 | 71 |
| Soybeans | 23 | 21 | 24 |
| Wheat | 32 | 29 | 36 |

## *Test-Demonstration Farms Compare Favorably With Other Farms*

An analysis technique used to measure progress on test-demonstration farms involved a comparison with a paired sample. The paired sample was drawn from records available through the Farm Bureau Farm Management Service. This cooperative effort of the University

of Illinois Agricultural Economics department and local associations now serves over 6,000 farmers throughout the state who pay an annual enrollment fee. The Farm Bureau Farm Management Associations either employ or recommend for employment fieldmen who visit and assist members at various times of the year with record keeping and management.

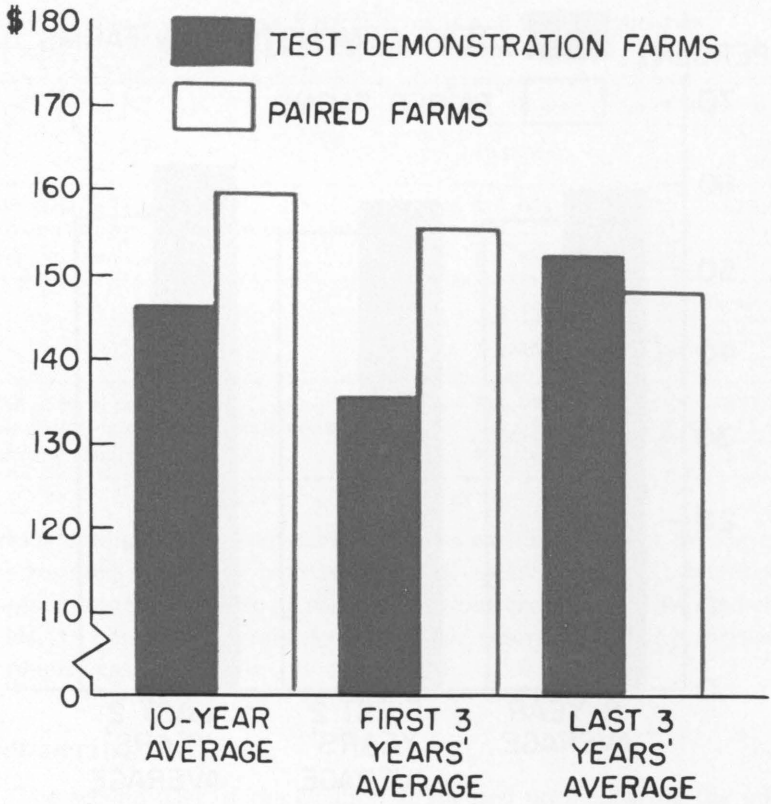
Farms from the same geographical area were selected from Farm Bureau Farm Management Associations and paired with farms in the test-demonstration farm program. The year of enrollment in the program was used as a bench mark for each demonstrator's farm. Another farm with similar resources belonging to the record association was selected as a paired comparison for each demonstrator.

The criteria used in selecting the farms paired with the test demonstrators were: (1) number of acres; (2) soil productivity rating; (3) age of operator; (4) livestock program; and (5) months of labor used. The tenure arrangement was a secondary criterion.

Available records of farmers in 18 counties from the same geographic area as the test demonstrators were considered during the pairing procedure. Many records could not be used because continuous records were not available for the ten-year period or the five-year period. Farm Bureau Farm Management fieldmen were consulted to remove farmers affected by poor health, inheritances, and any other unusual characteristics.

Results of the opinion estimates indicated that the paired sample of farm operators from record-keeping associations had a higher level of management ability. The paired-sample farmers are a rigorous basis for comparison, not only because of the higher estimated management ability but because they had voluntarily become members of the record-keeping service.

Livestock-production efficiency increased at a rapid rate on test-demonstration farms during the ten-year period. A comparison of the changes in efficiency of livestock production is shown in Figure 3. Test-demonstration farms increased returns per $100 of feed fed for hogs at a more rapid rate than the paired group of farms from the first three years compared with the last three years. Improved livestock practices increased returns above feed cost from $1,525 in the first three years to $4,502 in the eighth, ninth, and tenth years for the test-demonstration farms. Paired sample farms increased livestock returns over cost from $2,497 to $3,783 from the beginning to the end period. The ability to follow through on details of livestock breeding, feeding, and management pays dividends to the farm family in increased earnings.

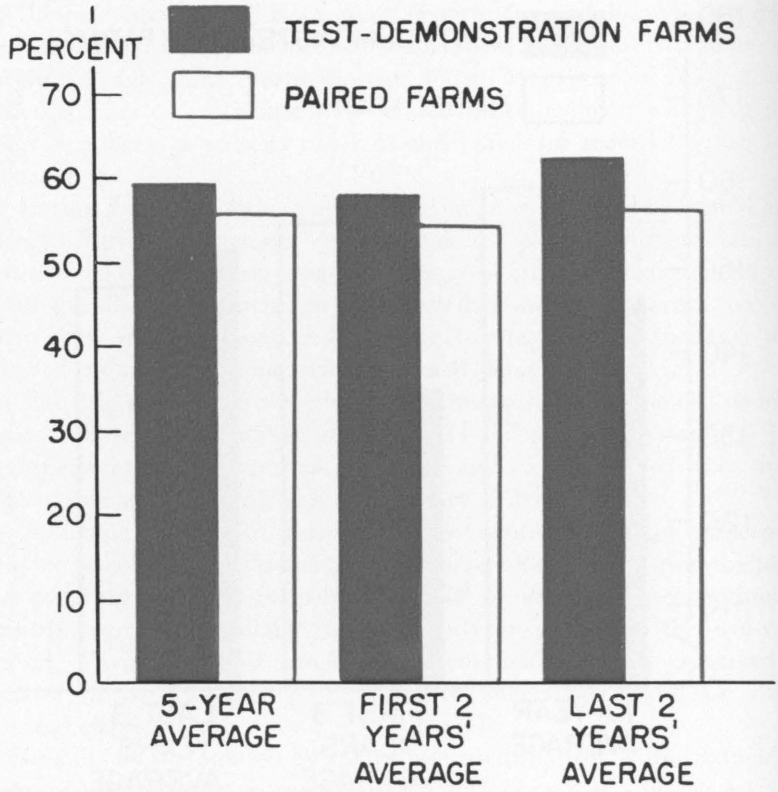



Returns per $100 of feed fed to hogs beginning in 1953, 1954, and 1955 on 20 test-demonstration farms and 20 paired farms. (Fig. 3)

Test-demonstration farms also had a higher percentage of tillable land in corn and soybeans in the fourth and fifth years. Increasing percentages of corn and soybeans are reflected in increased earnings shown in Figure 4.

Higher returns from the dairy and beef-cow-herd enterprises and intensive crop programs accounted for higher farm and family earnings for test demonstrators in comparison to the paired sample of farms.

Management returns over the five-year period increased more rapidly on test-demonstration farms than on the paired-sample farms. Figure 6 illustrates that average management returns were also higher




Percent of tillable land in corn and soybeans on the five-year group of 43 test-demonstration farms and 43 paired farms. (Fig. 4)

over the five-year period. Associated with the higher management returns were lower labor costs, and lower building, fence, and machinery and equipment costs.

## Farm Business Earnings

Farm earnings measured by the value of farm production increased in both groups of test-demonstration farms studied. Costs of operating a farm business have increased. Farm and family earnings, reported in Table 3, reflect the earnings remaining after cash operating expenses and depreciation are deducted from the value of farm production. Both groups of farms increased earnings at rapid rates over the time

Table 3. — Average Farm Earnings and Cost Summaries for Test-Demonstration Farms Studied

| | 10-year group of 20 farms | | |
|---|---|---|---|
| | 10 years | First 3 years | Last 3 years |
| Value of farm production | $19,003 | $14,580 | $23,921 |
| Cash operating expenses plus depreciation | 11,117 | 8,161 | 14,306 |
| Farm and family earnings | $ 7,886 | $ 6,419 | $ 9,615 |

| | 5-year group of 43 farms | | |
|---|---|---|---|
| | 5 years | First 2 years | Last 2 years |
| Value of farm production | $16,991 | $13,691 | $19,659 |
| Cash operating expenses plus depreciation | 9,545 | 8,041 | 11,423 |
| Farm and family earnings | $ 7,446 | $ 5,650 | $ 8,236 |

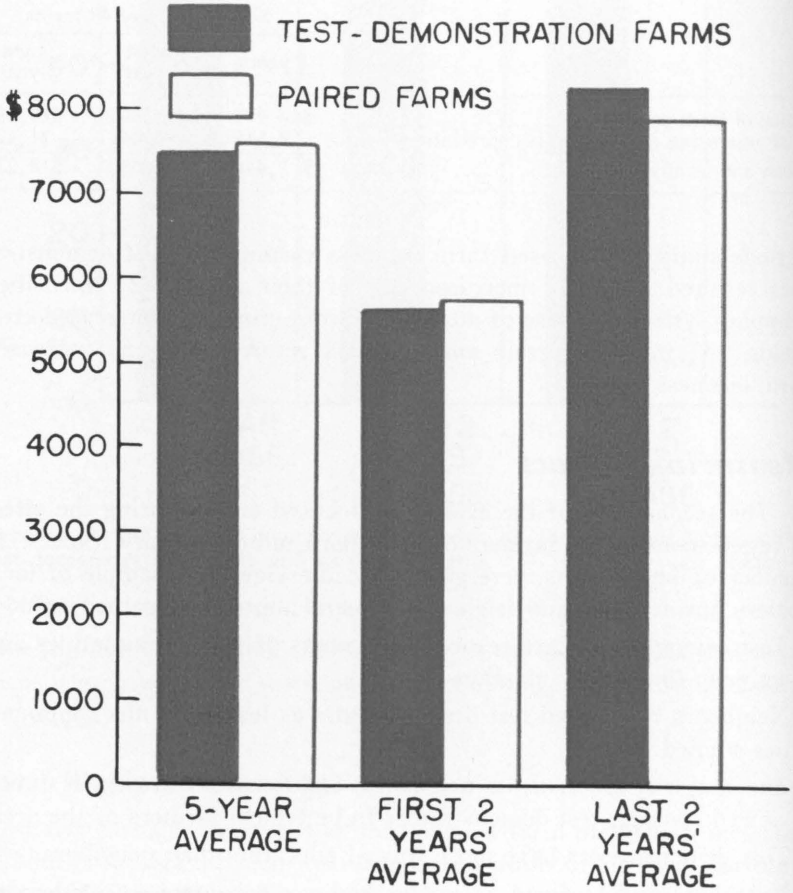
periods studied. Increased farm business earnings by test demonstrators resulted from (1) increased size of their farms, (2) intensified cropping systems and use of more high-profit crops, (3) increased crop yields, (4) increased grain and livestock returns, and (5) increased farm business volume.

## *Measuring Impact*

The second part of the evaluation focused on measuring the effect of test-demonstration farmers on neighbors and community leaders. A number of impressions were gained by interviewing a sample of local leaders, businessmen, and neighbors. General impressions gained include:

- Test demonstrators are respected members of their communities and active in formal organizations.
- Neighbors recognized test demonstrators as leaders in the communities studied.
- The majority of friends, neighbors, and business associates interviewed consider test demonstrators to be typical farmers of the area.
- Test demonstrators have more formal education than neighbors.
- Neighbors and business associates know and recognize test demonstrators since they have lived in the community for over ten years.
- Influential people are quite familiar with test-demonstration families and notice the economic progress of the group.

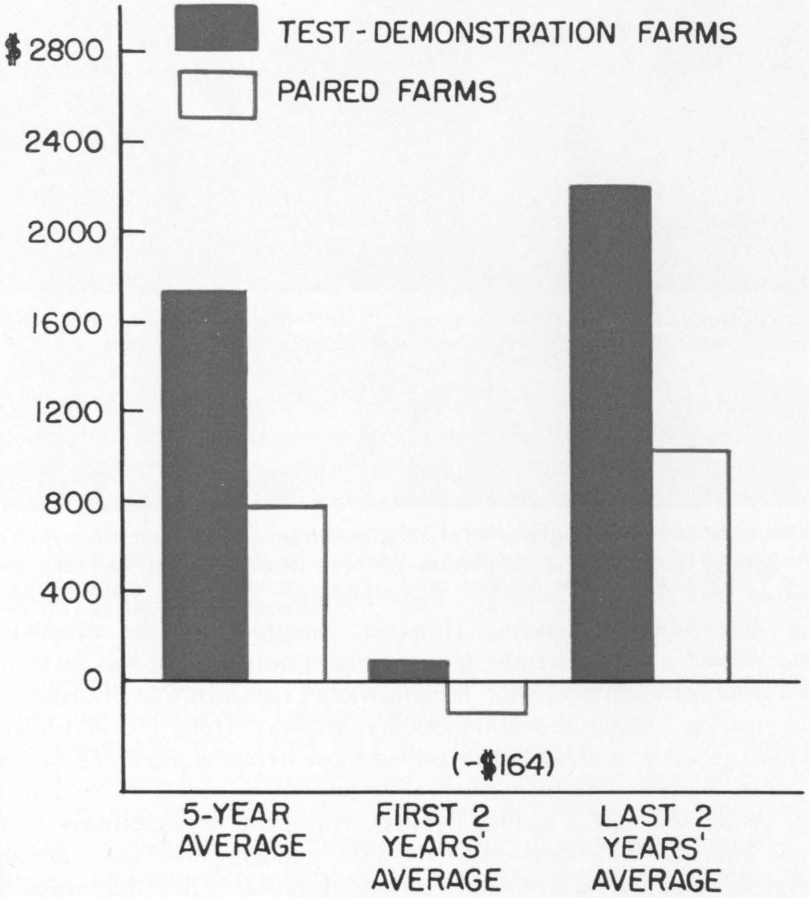
- Good livestock and crops, well-kept buildings, and neat appearance of test-demonstrators' farmsteads impress local leaders, businessmen, bankers, and community organizations.
- Local influential people attribute ambition, good management, being a soil builder, progressiveness, being well informed, and making wise investment decisions as personal test-demonstrator success characteristics.



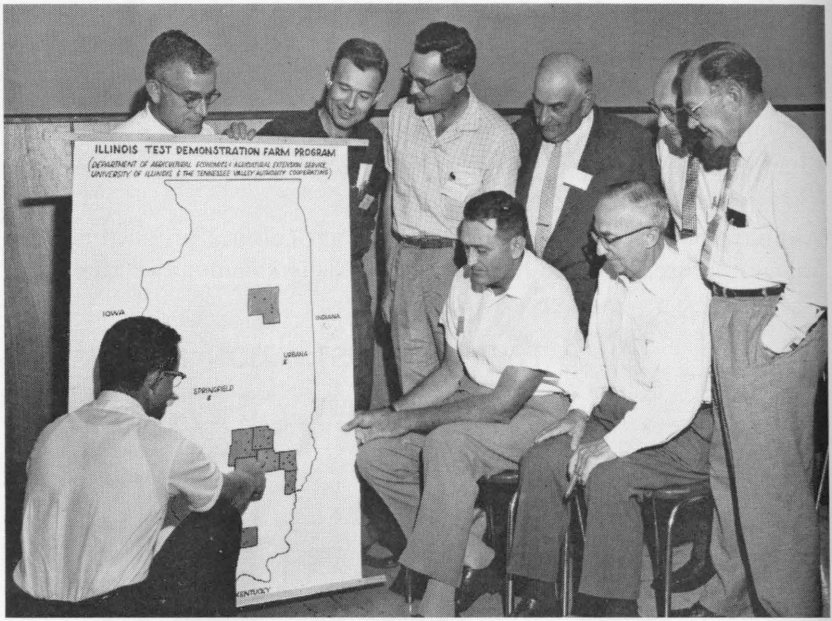

Farm and family earnings on the five-year group of 43 test-demonstration farms and 43 paired farms. (Fig. 5)

## Test Demonstrators Influenced Neighbors

- One-half of the neighbors interviewed indicated they had received secondary benefits of improved crop and livestock practices resulting in improvement of their farm businesses.
- Improvement of crop fertility programs was the most widely acknowledged benefit received by neighbors.
- A diffusion of economic principles and agricultural production techniques occurred among neighbors in various communities studied.




Average management returns on the five-year group of 43 test-demonstration farms and 43 paired farms. (Fig. 6)




**Tennessee Valley Authority personnel confer with and advise members of the University of Illinois staff about test-demonstration activities.**

Ninety percent of the test-demonstration families said that they had acquaintances who had adopted test-demonstration practices, particularly in the area of soil fertility. Nearly 60 percent of farmers interviewed who lived near test-demonstration farms gave acquaintances as a primary source of agricultural information.

Almost half of the neighbors of test-demonstration farmers admitted that they had changed their fertilizer practices after observing demonstration results. However, one-third of the neighbors interviewed were apparently unaware that a nearby farm was involved in a demonstration program. Demonstrators reasoned that diffusion of information among acquaintances living away from the immediate neighborhood was greater than among those living on adjoining farms.

Demonstrators' influence was greatest among people of their own age group who had a similar livestock enterprise or some other common interest. The demonstrators were younger than their nearby neighbors and had received more formal education. They also tended to be more specialized in their farming enterprises.

Educational tours sponsored by the Extension Service and other organizations gave many people other than acquaintances and neighbors the opportunity to see the results of the whole-farm business de-


**The test-demonstration program is publicized with photographs such as this that emphasize cooperation of farmers, Extension Service personnel, and local business leaders in increasing farm income and productivity. Photo courtesy of Successful Farming.**

velopment efforts. These tours included visitors from other counties, other states, and several foreign countries.

People who cooperated with the Cooperative Extension Service and the Illinois test-demonstration farm program also received benefits through improved family living. For example, thirteen new homes were erected by families in the program. Many of these were designed in consultation with University of Illinois agricultural engineering specialists. Although a better financial position was credited for making these homes possible, the families suggested that the motivation, desire, courage, and self-confidence gained from the program were important in planning and realizing the improvements.

## *Implementing Recommendations*

The recommendations based upon the evaluation are being implemented in the Illinois test-demonstration farm program. Increased use will be made of mass media to inform business leaders, educational leaders, religious leaders, and other community influentials of program purposes and objectives. The publishing of success stories in various magazines and newspapers adds prestige and stature to both the program and the individual cooperator. Personal publicity will be used with discretion or demonstrators will no longer function as respected leaders in the community.

More organized tours for community leaders and businessmen are being planned on test-demonstration farms. Well-designed roadside signs that identify test-demonstration farms have been provided to the participating counties.

Bench mark data on the financial situation, family structure, and goals are being recorded. Photographic evidences of family size, living conditions, cropping conditions, and livestock situations are being secured each year. Farm advisers, extension councils, and other community leaders are encouraged to select new cooperators for advisory-committee approval.

Families are encouraged to participate in 10- to 16-hour farm and family business management schools conducted by area advisers. These schools are part of the total farm-management educational activities in the state. A major portion of newly enrolled test demonstrators have participated in the schools.

Continued cooperative efforts with other agencies and local groups will be a part of future test-demonstration activities. Cooperation with the Farmers Home Administration, Soil Conservation Service, Production Credit Associations, FS Services, Agricultural Stabilization and Conservation Service, local bankers, and others has helped to develop successful test-demonstration farms. These team efforts will be continued in the Illinois test-demonstration farm program activities.

Further information about the Illinois test-demonstration farm program may be found in the following sources.

ERICKSON, D. E. Role of Illinois test-demonstration farm program in farm management extension education activities. Jour. Farm Econ. 48:1613-1618. 1966.

GRAHAM, F. P. An evaluation of the Illinois TVA test-demonstration program. Unpublished M.S. thesis. University of Illinois. 1965.

GRAHAM, F. P. Illinois test demonstrations. Extension Service Rev. 37(11):10-11. USDA FES. 1966.

4M—4-67—92682